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Water Management Assets and Their Use in the Delta
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January 10, 2000

INTRODUCTION.

CALFED must solve the Delta export operations problem to succeed.

The problem *is simple to state, difficult to solve.* ***In dry years, Delta operations are constrained by limited upstream storage and runoff.***[1] **In wet years, Delta operations are constrained by pumping limitations (environmental and hydrodynamic) and limited south of Delta storage.**[2] Runoff patterns cannot be changed. Nor can the locations of fish within the Delta. Therefore, the solutions to the problem must involve a combination of the following tools:

- Upstream storage and south-of-Delta storage (to capture more wet year water for use in dry years).
- Higher allowable pumping limits in the south Delta (to allow capture of greater volumes of water during favorable periods).
- Real-time management of diversions (to allow reduced fish take for any given level of overall diversions).
- Improved screening (to allow reduced fish take for any given level of overall diversions).
- Relocation of the Delta export intakes (off the table until Stage 2).
- Market tools to allow export areas to accommodate fluctuations in supply levels – transfers and efficiency.

These various tools interact with the others to achieve an overall effect. A simpler way to conceptualize the problem is consider the concept of "surplus summer delivery capability" (SSDC). That is, how much export water could the export system theoretically delivery during the summer growing season during wet and dry years at constant levels of entrainment. The challenge is to either increase SSDC or to squeeze new benefits out of the system without reducing SSDC. This is not to say that increasing summer deliveries exports is the only issue involved in export operations. The point is simply that systems with higher SSDC have the ability to either delivery more water, save more fish, or some combination of the two. Indeed, the essential problem is that CALFED must simultaneously deliver more water <u>and</u> save more fish to gain broad support for its solution. For example:

- Upstream storage and south-of-Delta storage will increase dry year SSDC. South-of-Delta storage will also increase dry year SSDC by increasing the amount of water deliverable without causing low point problems in the summer.
- Higher allowable pumping limits in the south Delta will increase SSDC in all years by allowing higher exports in dry years and by allowing storage to recover more easily from environmental requirements in wet years.
- Real-time management of diversions and improved screening increase SSDC by reducing the pumping restrictions needed to hold entrainment to a given level. Remember that SSDC is just an index. Increases in SSDC could just as easily be converted into fish protection so that exports remain constant and fish protection increases.
- Market tools increase SSDC if we define deliveries of purchased water and conserved water as new water.

Then there is the problem of distributing the benefits of SSDC. Here, the needs of fish and the need to deliver water will compete in many cases. For fish protection, we would want to limit increases in exports and consume any new SSDC on fish

[1] The problem is obvious during extended droughts. Upstream storage levels buffer low runoff for a year or two, then major cuts in exports are made.

[2] Assuming that exports are about 6 maf per year and that export capacity is 11 kcfs for 11 months and 3 kcfs for one month (during VAMP), then the export pumps must average 8.2 kcfs or about 80% of allowed capacity just to meet this level of delivery. This ignores fluctuations in Delta inflow, export standards outside the VAMP period, outages for maintenance, and the use of the pumps to fill storage during wet periods for use in dry. Thus, the export system has only a limited ability to pursue alternative export pumping patterns without significantly reducing the reliability of project deliveries. During 1999, a reduction in exports for water year 1999 of less than 10% to protect Delta smelt caused a major crisis during the peak summer demand period because of the lack of project storage to buffer the outage. Even though a cool summer and borrowed storage allowed the projects to get through the summer, significant amounts of additional water must be exported this winter to in order to recoup the losses. If the lost pumping cannot be made up this winter, deliveries to water users may be reduced next year.

protection (e.g., greater reductions in exports in the spring). For exports, we would wish to limit increases in fish protection and increase summer export deliveries. How SSDC is ultimately divided is a policy question. However, note that the needs of fish and the needs of exporters are not completely competitive. Given existing standards, fish gain the most additional protection against entrainment by consuming SSDC during wet years. Most exporters would prefer to consume additional SSDC during dry years. Therefore, it may be possible that additional SSDC may be divided in a way that gives the two sides most of what they want.

What is left out of this paper? Instream flow and Delta outflow issues are not included. Water quality is not part of SSDC, though clearly lower quality water is less desirable to exporters. I do discuss the possible use of some facilities for improving water quality below, however. The possibility of habitat credits to compensate for increased entrainment is not included. These are all very important issues. However, we do not even reach these issues unless we can solve the export/ entrainment issue (I assume). Conceptually, they could all be dealt with by expanded the SSDC concept. On the environmental side, instead of referencing SSDC to a constant level of entrainment, we could reference it so some more generalized level of environmental health. In that case, upstream flow levels, Delta outflow, and habitat would all become part of the SSDC calculation. Similarly, the volume of water exported could be discounted according to the quality of the water. A lower volume of high quality water would equal a higher volume of lower quality water.

SUMMARY OF POSSIBLE ASSETS

The various tools available for these purposes are listed in the table below. A few comments on the various tools may be useful, based upon gaming experience. Note that these tools all create the potential for additional environmental damage, if operated solely for the benefit of water exports. However, with proper operation, mutual benefits should be possible. One of *the main functions of the EWA is to create an institutional framework capable of assuring proper operations of present and future export tools.*

- **Increased allowable pumping capacity at Banks/Tracy.** This is the single most effective measure that could be taken, whether to accommodate greater fish protection or to increase system exports. Delta outflows routinely rise above 100 kcfs during winter storms. Even during dry years, outflows will frequently rise above 40 kcfs for limited periods. Yet, total export capacity is generally limited to 11 kcfs. An increase in total export capacity from 11 kcfs to 15 kcfs could create an enormous amount of new *flexibility during wetter years to meet export demands, despite using more fish-friendly* export patterns. During dry years, it could allow for increased exports during occasional high flow periods.[3] It could make south-of-Delta surface and groundwater storage far more cost-effective by increasing the likelihood that storage could be filled on a regular basis. In combination with the Joint Point of Diversion (JPOD), it would provide very significant increases in supply and/or flexibility to the CVP. Finally, it would strengthen operational contact between export areas and upstream storage and improve the cost-effectiveness of upstream storage, whether for environmental purposes or for increasing deliveries.[4]
  Smaller increases in Banks pumping capacity for limited periods of the year have been proposed as an interim measure. Similarly, an intertie between the Delta Mendota Canal (DMC) and the California Aqueduct of 400 cfs has been proposed to allow Tracy pumping to routinely pump at its 4.6 kcfs rated capacity. Both of these actions would provide some new benefits. However, the benefits possible from a full expansion of Banks are probably an order of magnitude greater.

- **South-of-Delta storage.** Without increases in allowable pumping capacity at Banks, the value of south-of-Delta storage to CALFED is somewhat limited. Additional storage could be filled occasionally under present circumstances. However, given that the EWA and b(2) actions *will consume much of the remaining flexibility in the system, the availability of* surplus water to put into storage without increased Banks pumping capacity will drop even below current levels. For example, as a result of the May – June export reductions for Delta smelt in 1999, the SWP will not fill its share of San Luis Reservoir until the end of January, despite reducing interruptible supplies. The CVP share of San Luis will take even longer to fill. Without the Delta smelt export reduction (the kind of action we might expect from the EWA), San Luis

[3] This water could either be used to increase dry year water supplies, or to justify modifications in export pumping to protect fish.

[4] Export capacity limitations frequently isolate the export area from upstream storage for extended periods of time. For example, during 1999, there is adequate upstream storage to compensate for export reductions required during May and June. However, due to limited export capacity, the water could not be moved into the export areas during the benign export months of July – September.

might have filled as soon as December. Since new south-of-Delta storage capacity only represents new usable storage after San Luis fills, delays in filling San Luis reduce the utility of new south-of-Delta storage. Given that allowable Banks pumping *will be increased as part of CALFED (and that not all of the new flexibility will be consumed by EWA actions)*, new SOD storage begins to look more attractive. The storage can be filled with water during wetter than normal years. If used for export water users, the storage can be used to boost dry year deliveries. If used for the EWA, the water can be used to help supply replacement water when pumping reductions are made to protect fish, particularly during wet years.

- **Upstream storage.** Upstream storage can modulate flow patterns between the intake/release point and the Delta. Thus, a groundwater storage project on the Feather River could be used to improve local instream flows, improve Delta inflow, improve Delta outflow, generate local yield, and produce water for downstream or export users. Moreover, since discretionary reservoir releases upstream of the Delta are frequently in excess of regulatory requirements, storage can frequently be moved (or "backed") from one storage site to another to increase the utility of the water.[5] Finally, upstream storage can be used to improve dry year exports. However, during non-dry years, the ability of upstream storage to support increases in exports will be limited until greater surplus capacity is created at the export pumps as discussed above.

- **Near-Delta storage.** Storage connected to both the export canals and to the Delta has even greater utility than south-of-Delta storage. It has all the benefits of south-of-Delta storage, plus the additional advantage that it can divert water even during periods when the export canals are full (like north of Delta storage). Given the great variability in Delta outflow patterns, this is a great advantage. Examples would include Delta island storage or an enlarged Los Vaqueros Reservoir. Delta island storage not directly connected to the export pumps is essentially identical to storage upstream of the Delta. Delta island storage would generally be used for short-term storage. It would fill during most wet years. The water would then be exported to support higher storage levels south-of-the-Delta. With current storage levels south of Delta, the net effect would be to fill San Luis earlier. This provides for environmental flexibility, but now new exports. However, with additional south-of-Delta storage, water diverted into Delta islands could become more important as a way of filling empty storage space south-of-Delta. Los Vaqueros would have somewhat lower input/output characteristics and would generally hold water for longer periods. In that sense, it would look at bit more like south-of-Delta storage, while Delta island storage would look a bit more like upstream storage.

- **High priority access to surplus capacity.**
  Joint Point of Diversion

  Surplus pumping, conveyance, and storage capacity exist within the state and federal projects. That is, there are periods when the canals and reservoirs have empty space. This surplus can be converted into operational flexibility and used to protect the environmental (if capacity is given to the EWA). Alternatively, the surplus can be used to increase total water diversions. The Joint Point of Diversion would give the Projects automatic access to surplus diversion capacity at each other's Delta pumping plants. Also, state legislation allows non-Project water transfers to move through Project facilities.

  The prioritization of the use of surplus capacity is a key issue. JPOD is an obvious way to increase CVP exports from the system. Capacity in the DMC is very small compared to export demand on the CVP. Any significant reduction in allowable pumping at Tracy (e.g., for VAMP) cannot be recouped by the CVP at other times of the year. The JPOD would allow the CVP access to the SWP export facilities – the Banks pumping plant and the CA Aqueduct -- when surplus capacity exists. In essence, some existing flexibility in the SWP system would be converted into greater water diversions for the CVP.

  But JPOD will limit the ability of the EWA to export water on its own behalf. Both JPOD and EWA operations will limit capacity available in the market. One way out of this dilemma is to increase the amount of surplus capacity available by increasing available pumping capacity at Banks. In any case, it is quite clear from simulations run to date that routine, high priority access to Project facilities (pumping, conveyance, and storage) is essential to the success of the EWA.

- **Access to unused Project, non Project and EWA storage.** Just as the use of unused capacity can create flexibility and/or yield, the use of unused stored water can create flexibility and/or yield. For example, in the use of **demand shifting**, the EWA would induce (in a market setting) local agencies to temporarily rely upon unused local storage in order to maintain storage in San Luis Reservoir. Similarly, if San Luis Reservoir has unused storage (i.e., storage that is not immediately needed by the Projects), the EWA could borrow that storage (based upon solid collateral and a commitment to replace the storage before it is needed). Finally, the Projects may be able to utilize unused EWA storage in San Luis Reservoir in order to deliver more water during the summer without running into low point problems.

[5] Whenever a reservoir is making discretionary releases above local regulatory minima (e.g., to support exports or Delta outflows), the releases could be reduced and storage built up in the reservoir, if an equivalent amount of water is released from another storage site to maintain total releases.

- **Water, Storage Purchases and Efficiency.** Functionally, water purchases and efficiency are very similar. In both cases, CALFED or the EWA will make an investment in return for reduced demand by a water user. To be useful, that reduced demand must be convertible into real benefits. Thus, for example, the EWA might buy water from farmers in the export area. As part of the transaction, the Projects would deliver less water to the farmers and more water to the EWA. Whether the reduced demand is a result of improved efficiency (e.g., changed irrigation) or fallowing does not change the operational characteristics of the transaction. Similarly, CALFED could invest in water reclamation in southern California. CALFED could either donate the water saved to the Projects (in which case CALFED would get credit for creating new export supplies) or CALFED could require that the EWA would receive water from the Projects equal to the amount of water saved by the reclamation projects. Combining these two approaches, we might assign the water to the users during dry years (when they need the water the most) and to the EWA in wetter years (when the EWA has very great needs for water). *Similarly, CALFED or the EWA might invest in agricultural efficiency in order to reduce applied water* and fish entrainment at the ag diversion point. The transaction might not generate water, but it could have valuable fish benefits nonetheless.

  The market is not merely a water acquisition tool for the EWA, however. It is also a transportation tool. With the exception of the export canals, California's conveyance infrastructure is quite limited. Plumbing limitations directly affect the ability of the EWA to move water to where it is most needed in the system. In particular, it is frequently impossible to back water up from export storage to upstream storage, or from one upstream basin to another. However, if water is difficult to transport, money is not. Markets provide the ability for the EWA to sell water in one area, take the proceeds and purchase new water elsewhere at a location of greater environmental need. EWA will also have the ability to purchase storage rights from local dam and groundwater operators in a market. For this reason, we cannot assume in advance that the EWA will necessarily drive up the price of water in export areas. The EWA may end up becoming a major seller of water in the export area, driving prices back down.

- **Regulatory Modifications.** Any relaxation in the regulatory constraints that govern operations *will, by definition,* increase available capacity in the system. That increased capacity can either be converted into increased flexibility and used by the EWA or it can be converted into an increase in total exports. The relaxation of the COE requirements on Banks (discussed above) is a good example. As another example, relaxation of the E/I standard increases allowable export pumping. If that relaxation is controlled by the EWA, it can be used on a real time basis to modify export pumping patterns to improve fish protection without reduction in overall exports. Alternatively, the E/I relaxations could be used to support increased overall exports. Or a combination is possible. Similarly, the X2 standard could be relaxed in such a way as to increase flexibility for the benefit of fish, or converted into greater overall diversions. *Again, a combination is* possible. An E/I relaxation under the control of the EWA has been gamed extensively by the DNCT and appears to be very valuable. Similarly, we could consider giving the EWA the right to modify the X2 standard in order to generate upstream or export area storage. Another approach would be to modify the E/I and/or X2 standards and to share the operational benefits between the EWA and the water users.

PRIORITIZATION

It is impossible analytically to come up with a priority list of assets with their allocation between the EWA and the users. In some cases, particular assets seem indispensable. In other cases, however, numerous combinations of assets could provide similar benefits. In such cases, the correct choice will be determined as much by political as technical considerations. With that said, here are a few rough thoughts:

- Expansion of the allowable capacity of Banks is a sine qua non. In theory, the EWA could survive without major increases in surplus pumping capacity through massive efficiency and export market programs. In practice the size of the compensatory efficiency/ market programs is probably infeasible. The EWA must share in the benefits of expanded allowable export capacity. Otherwise, the expansion of Banks will actually damage the EWA's ability to protect fish.

- Efficiency programs appear to have strong political support, despite their high cost. CALFED funded efficiency could generate over 100 kaf per year of efficiency water, to be shared between water users and the EWA. This is a sizable chunk of the needed water.
- EWA initiated water purchases appear to be necessary, particularly during the first few years. As the EWA gains access to larger amounts of storage over time, the need for transfers will decline. However, access to markets is likely to always be a part of the EWA program. Purchases may, in fact, be the main form of EWA activity on certain non-Project tributaries well into the future.
- The EWA must have routine and high priority access to state and federal infrastructure.
- The utility of groundwater storage south of the Delta for the EWA is less than we might hope for. However, groundwater does appear very valuable for water users. The reasons are straightforward. The water users are faced with the need to store wet year water for use in dry years. Groundwater storage is an ideal tool for this kind of cross year stockpiling. By contrast, gaming has shown that the EWA does not stockpile, but consumes its available resources during wet years. Groundwater is not a particularly effective tool for the EWA during wet years, because the output capacity of the groundwater basins under consideration is very small compared to the rate at which the EWA can accumulate debt (consider how quickly the environment racked up debt during the spring of 1999). Moreover, the EWA has little need for large quantities of stored water in dry years. For this reason, the EWA will tend not to fill groundwater during wet years, and is unlikely to need the storage during dry years. The main benefit of groundwater storage for the EWA is as collateral for loans of surface storage from the Projects during wet years.
- Delta storage connected to the export pumps is everything that groundwater storage is not. It is easy to fill, easy to empty, and cheap to operate. It can provide increases in peaking Delta diversion capacity above and beyond the Banks capacity improvements, thereby increasing overall system flexibility. At the maximum size examined (200 kaf during game 1b), it can substantially buffer reductions in spring exports made to protect fish. It might be operated to improve urban drinking water quality (if connected to the Delta Mendota Canal, the March TOC peak could be shunted away from urban supplies). Because Delta storage fills much more readily during wet years, it is probably most appropriate as an EWA tool, or possibly as a CVP project (in order to boost wet year deliveries to its ag exporters). The islands appear to generate fewer benefits for the SWP.
- E/I relaxations appear to be an essential tool for the EWA. The appearance of fish at the pumps is sporadic enough that significant net benefits can be generated if exports can be increased during periods when the fishery impacts of diversions are relatively low.

OTHER INFLUENCES ON DELTA EXPORT OPERATIONS

- **CVPIA – b(1)/ b(2)/ b(3).** The DOI accounting system resembles the EWA in many ways. DOI may consume b(2) water in meeting the 1995 WQCP, VAMP or other export reductions, in meeting AFRP flow targets upstream, and in boosting Delta outflows. There are some key differences, however. EWA actions are taken on a "no harm" basis. The EWA must see that all water deliveries remain unaffected by its operations. In contrast, b(2) water may have variable impacts on water users, depending upon when and where it is applied, and the balance point between b(1) and b(2) actions. This difference will potentially create conflicts between the EWA (or USFWS) and the Projects. For example, an EWA manager will naturally wish to induce no-cost reoperation by the Projects as much as possible. Thus, if San Luis Reservoir is likely to fill, the EWA manager will simply borrow water in San Luis to get an export reduction in, say, January. If San Luis fills in February despite the export reduction, the debt is wiped out. However, the existence of b(2) water clouds the issue. The Projects are likely to insist that b(2) water be used to support the January export reduction. Otherwise, the b(2) water may be used to reduce exports later in the year when they cannot be made up. Thus, as long as the application of b(2) in the export areas is undefined, the opportunity to implement no-cost reoperation may be limited. Additional thought is needed on how to eliminate this problem.

- **ESA.** EWA could be defined as a general environmental enhancement tool that operates above all regulatory requirements, including the requirements of the ESA. Alternatively, the EWA could be oriented toward the protection of endangered species and, by committing to allocate its assets to protect endangered species, could allow regulatory certainty to be granted to water users by the ESA agencies. Many possible scenarios exist between these two extremes. Generally speaking, the more that water users are willing to pay into the EWA, the greater the insulation the EWA might provide the users against the implementation of the ESA.

- **State and Federal Projects.** The state and federal projects already have established rights from the SWRCB, contracts with a large number of water users, and a working relationship between each other via the Coordinated Operations Agreement (COA). The EWA must be grafted into this set of rights and relationships without harming existing users. In the short run, it is almost inevitable that the EWA will operate under the aegis of the state and federal Projects. The Projects control many of the rights and much of the infrastructure needed by the EWA. Indeed, the Projects could, if they so chose, modify their operational patterns to protect fish even without the existence of the EWA. However, to do so would jeopardize their contractual commitments to the water users. In many respects, therefore, the EWA may be seen as an institutional creation designed to eliminate the risk to the Projects resulting from more protective operations. The ability of the Projects to reoperate on behalf of the EWA (given the appropriate reimbursement and protections) will greatly simplify CALFED's task. However, difficulties remain, particularly with respect to the allocation of assets not yet on line. For example, what will be the EWA's rights to use new capacity at Banks? Do JPOD diversions take precedence over EWA diversions? How will rights to new Delta island storage be divided? What kind of collateral must exist before EWA can borrow unused storage?

- **ERP Water Program.** CALFED's ERP has identified a number of flow targets upstream. It seems logical that the EWA should be responsible for any ERP flows and that it be allocated the resources needed to develop those flows. Including these responsibilities under the EWA umbrella is likely to reduce overall costs since some of the ERP flows may be provided from EWA assets in the Delta (e.g., the EWA could back water upstream or could sell diverted water to provide the needed funds). Similarly, ERP water will frequently provide benefits downstream to the EWA (via rediversion or Delta outflow).

- **SWRCB.** EWA rights are built upon a regulatory foundation. A very large fraction of the operational protection accorded fish is likely to remain hardwired as regulatory constraints. The EWA and Project distribution of assets cannot be determined unless the regulatory foundation or baseline is also simultaneously agreed to. If the regulatory baseline of protection will increase as a result of CALFED, then the fish need less protection through the EWA (and the water users will need a greater share of assets to recoup their losses to regulation). Similarly, if the regulatory baseline will drop as a result of CALFED, then the EWA will need more assets in order to compensate and the water uses will need fewer assets.

  This is not a zero sum game, however. Regulations can be combined with EWA rights in ways to maximize fish protection and water deliveries. When fish protection needs are sporadic, complex, and of variable priority, protection through the EWA is highly preferable. Thus, there is broad support for granting the EWA the ability to modify export rates to reduce fish entrainment (on a no net loss baseline compared to the existing E/I standard). This device will improve fish protection without harming water users. When fish protection needs are predictable, simple to determine, and of constantly high priority, then protection through the EWA may not be superior to standards (though the EWA should be no worse). For example, the April-May export reductions under VAMP are consistently very protective according to gaming performed to date. In cases where fish protection needs may be predictable and easy to determine, but are of low priority, a case can be made for relaxing baseline standards and sharing the water saved between the EWA and the water users. As an example, ag/urban stakeholders have suggested that there is no evidence that the X2 standard provides significant ecological benefits at Delta outflows below 20 kcfs. They suggest that the X2 standard be relaxed for flows below 20 kcfs and that the EWA and the Project should share the water saved. If the EWA could convert this new water into high priority protection, then the environment would achieve a net benefit from the new arrangement.

- **Water Quality Program.** Agricultural and (particularly) urban agencies have sought to assure that EWA operations do not degrade export water quality. Indeed, there is some sentiment that export water quality improvement should be an explicit part of the EWA's mission. This will not work. The whole point of the EWA is to endow the environment with its own resources in order to maximize environmental protection. Dividing that mission to include objectives that may help water users while harming fish is simply a prescription for internal paralysis. Moreover, most of the water quality actions envisioned for the EWA could just as easily be carried out by the Projects on their own behalf.

  Nevertheless, the relationship between the EWA and water quality cannot be ignored. Some EWA actions may improve export water quality. Other EWA actions could degrade export water quality. Moreover, the allocation of assets between the EWA and the Projects should be slanted toward giving the Projects the ability to protect their own water quality. Here are several ideas:

  - The Project/ EWA relationship could include an incentive/disincentive element to internalize the value of high quality water into EWA decisionmaking. For example, the EWA might be charged a fee for actions that increase the mass loading of salts or TOC. Conversely, the EWA might receive incentive payments for actions that reduce mass loading. If the pricing system were set at appropriate levels, it would nudge the EWA toward improving water quality without foreclosing its ability to protect fish. Since the EWA would probably both receive and pay fees each year, the total net cost would probably be very small.

- Design infrastructure to protect water quality. The existing export infrastructure was not created with water quality protection in mind. Water exported from the Delta cannot be segregated easily. Rather, both the state and federal canals dump into O'Neal forebay and San Luis Reservoir. Thus, the canals cannot be segregated from each other, nor can water exported during one part of the year be segregated from water exported during another part. Yet, water quality in the Delta varies dramatically over the course of a year. Moreover, given the possibility that the Projects might be able to access storage near the Delta, there is no reason that the two canals must carry the same quality of water at any given time.[6] Finally, different users have different concerns. In particular, water high in TOC is a problem for urban treatment, but of no concern to agriculture. The possibility that we could segregate export water by conveyance facility, by time, and by end use provides abundant possibilities for reengineering of the system to significantly improve export water quality.

[6] For example, there is a very sharp peak in total organic carbon (TOC) over a period of just a few weeks each March. Today that water is pumped into San Luis Reservoir, where it contaminates water pumped during other periods. However, given adequate plumbing much of water water could be diverted instead onto Delta islands, and later used exclusively for irrigation along the DMC (or in the Delta). Urban water quality would get a significant boost, without loss in yield. Conversely, an enlarged Los Vaqueros Reservoir could be used to store high quality water until periods of low agricultural demand in the fall. Then the water could be sent through the system in a large slug for storage within the urban areas (e.g., within MWD's East Side Reservoir).

D-060100